Title: Collecting, Organizing and Displaying Data - Fast Food Discovery

Brief Overview:

The students will use problem solving strategies and their understanding of data to determine the class's favorite fast food restaurant, sandwich, side order and drink. They will collect, organize and display their data on a frequency table and bar graph. Students will solve a nutrition problem and create their own nutritional glyph.

NCTM Content Standard
Data Analysis, Statistics and Probability

- Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them
- Select and use appropriate statistical methods to analyze data

Number and Operations

- Compute fluently and make reasonable estimates

Grade/Level:
Grade 4

Duration/Length:
Three to four days (60 minutes).

Student Outcomes:
Students will:

- Collect data and organize data to answer questions
- Construct bar and line plot
- Display data using a variety of categories and sets of data
- Make statements, calculations and draw conclusions based on data

Materials and Resources:

- Graph/chart paper – (5 x 5 lSR6)
- Construction paper
- Fast Food Discovery (SR1)
- Fast Food Cutout (SR2)
- Frequency Table (SR3)
- Nutrition Information (SR4)
- Hundred block graph paper
- Burger Worksheet (SR5)
- Glyph Key (SR7)
- M & M Candy Sheet (SR8)
- Candy Survey (SR9)
- Frequency Table (SR10)
- Candy Response Sheet (SR11)
- MSA Mathematics BCR Rubric

Development/Procedures:

Lesson 1 Gather and Organize Data

Preassessment – Discover the student's knowledge of collecting data and understanding the purpose of a survey by asking questions. Ask students: How can we collect data? Record answers. What is a survey? Initiate discussion of a survey. What is the purpose of a survey? Record student answers. Students discuss their reasons for creating a survey. Pre-assess their ability to create a good question to investigate. What are some investigating questions which can be answered by conducting a survey? Make a list.

Launch – Based on concept attainment, present to students different kinds of fruit, cookies, and candy bars. Ask: What can I do to determine everyone's favorite fruit, cookie and candy bar? List responses on chart paper or have students make the list.

Teacher Facilitation – Tell students that collecting and organizing data is fun and very helpful in finding the answer to a question. Prepare students to complete a class survey to find out the most popular fast food restaurant, favorite sandwich, side order and drink. Give students (SR1) and have students complete the survey. Lead class to the understanding that in order for everyone to know each others' responses, we will have to display the data. Show students a frequency table and discuss the naming of the headings. Inform students that one vote is represented by one tally mark. Display titles for each question on board. Inform students of the titles on the board which are: Favorite Fast Food Restaurant, Favorite Sandwich, Favorite Side Order and Favorite Drink. Use the Favorite Food cutout sheet (SR2) to instruct students how to organize their data under each title in an organized way.

Student Application – Students will be given (SR2). They will record their response on the appropriate symbol and cut out their favorite restaurant, sandwich, side order and drink. Students will display their choices around the room under the appropriate title in an organized way. Students will discuss and write statements about each survey question. Students will work as partners to complete a frequency table (SR3) for the data represented.

Embedded Assessment – Assess each student's understanding of organizing and collecting data by observation and their ability to complete the frequency table.

Reteaching/Extension – Discuss how the data can be turned into a bar graph. Identify the x and y axis and the data to be recorded on each axis. Discuss the spacing and scaling on a graph. Students will transfer the results of the survey from the board to graph paper in the same order that it appears on the board. Inform students that each square on the graph paper represents one vote and can be represented as a tally mark on a frequency table. Students may graph the information from the survey in another way.

Lesson 2 Build a Burger

Preassessment - Remind students of previous lessons using bar graphs. Why do we use bar graphs? Elicit answers about the definition of bar graphs. The bars represent categories and the height of the bar represents a numerical count) Remind students of the previous lesson done on surveys. Have students read and explain the results. Explain that surveys are one of many ways to attain or collect information. Next, place three small

containers on a desk. Each container will represent three cookie choices which are Oreo, chocolate chip, and oatmeal raisin. In front of the containers should be 4 sets of snap blocks. Students will drop 1 block in the container representing the cookie they like. Guide students to understand that this is another way to collect data that doesn't require pencil and paper. After all children have voted, tally the results using a frequency chart (SR3). Discuss the results.

Launch - Introduce the word calorie. Ask students what they know about calories. Where are calories found? After eliciting answers, give the definition of calorie.

Show an example of an apple and a candy bar. Ask students to tell which snack has more calories? Why?

Teacher Facilitation - Give each child a fast food nutrition information chart (SR4). Explain why nutrition charts are used. Some people have dietary restrictions and they must watch the types of foods they eat. Discuss some of the reasons people may have to watch their diet. Sometimes charts are used to help us determine the number of ingredients or calories in our favorite food. Have students identify their favorite sandwiches. Guide children in determining which sandwich has the most calories and the least. (The same can also be done with fat and protein.)

Student Application - Explain to students that they will create their own McSandwich complete with the toppings of their choice. Give students the Burger worksheet (SR5). Show students a sample burger with toppings. Tell students to refer to their chart as they label the number of calories of each topping. After students have completed adding their toppings they will total the calories in their sandwich. (Ex: pickles - 10 calories, cheese - 70 calories = 80 calories.)

After children have completed adding their calories they will work in groups to complete a bar graph. Distribute the 5x5 graph paper (SR6). The bar graph for each group should include the names of the students across the *x*-axis, and the scale should be the number of calories listed in increments of 100. Students should label each axis and include a title. Each group of students will share the results of their graphing. Allow students to determine which person's burger contains the most calories and/or which group's burger contains the most calories.

Reteach / Extension - Allow students to write the results of the lesson along with their conclusion. Give students a journal prompt for their math journal.

Lesson 3 Read and Display Data

Preassessment – Give students a variety of tables, charts or fact sheets relating to food. Have students explore the data. Ask several questions relating to the tables, charts or fact sheets. Assess students' understanding of reading a table by their answers. Direct the students to select various items from an identified table and compute the total price of their items. Repeat. Select another category from the table to compute a total for identified items. Assess through discussion the student's knowledge of the meaning of calories, fat and sugar content.

Launch – Ask students: Do you think that all of Fast Food restaurant's sandwiches have the same amount of calories, sugar, fat, protein and sodium? Have students predict which restaurant has a sandwich that has the most calories.

Teacher Facilitation – Tell students that in order to determine the nutritional value of food, we need a source for information that will give the desired data. Give students Nutrition Information Sheet (SR4) for Fast Food sandwiches. Discuss the categories and their meaning. Let's explore the amount of fat, calories, and protein in a sandwich. Instruct students to write down their favorite sandwich from the sheet. Students will identify and write the amount of calories, fat and protein in their sandwiches. Discuss and define a glyph. Have students use the glyph key to show data about their favorite sandwiches.

Student Application – Give students a glyph key (SR7). Students will construct a glyph of their favorite sandwich using a paper plate, straws, markers and glue. Students will display their glyphs. Students will glue the appropriate straw to the paper plate. They will draw the fat symbols on the plate.

Embedded Assessment – Students will demonstrate their knowledge of reading a fact sheet and glyph key by constructing a glyph correctly.

Reteaching/Extension – Select another sandwich from the Nutrition Information Sheet (SR5) that is low in calories and fat. Ask the students if there is a connection between the number of calories and the fat content. Students will give their answer in words and numbers. Students will use the Nutrition Fact Sheet (SR5) to solve The Mystery Meal.

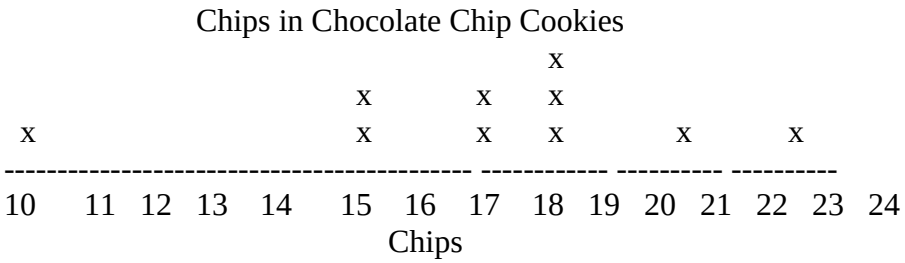
Lesson 4: – Excavating Chips

Preassessment - Facilitate a discussion among students. Ask what they remember about line plots. What kind of data do line plots give us? Have a student create a replica of a line plot on the board. Remind students that line plots display data using a number line.

Launch - Tell students to write down their first, middle and last names. Instruct students to count the letters in their first, middle and last names and to record it so they won't forget. Create a line plot on the board. Find the student with the least amount of letters and the greatest amount of letters in their name. Have students count the number of letters in their name and place an "x" in the correct place on the plot. Discuss the data with students including mean, median and mode.

Teacher facilitation - Students will be given a cookie and a toothpick and asked to excavate chips to find out how many chips are in each cookie. Tell students that if they find a half chip to put it to the side until they find another half which will then will be counted as a whole chip. Students must record the number of chips they've found on a class line plot, frequency table, or other graph.

Tally	Count



Student Application - Guide students in the excavating of cookies making sure students are recording in the frequency chart as needed.

Reteach / Extension - Have students work in groups. Give each student a package of M&M's. Have students tally how many times a particular color comes up within their group. The class will make one line plot for each M&M color to show the typical amount of each color that can be found in one bag. Use SR8 to make the line plots.

Summative Assessment:
Give students Candy Survey (SR9). Students will read the Candy Survey and display the data in a more organized way (frequency table). Record Results from Candy Survey on the frequency table (SR10). Student will construct a bar graph to display the data from the Candy Survey. Students will use (SR11) to make three statements about the data.

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Fast Food Discovery

Survey

1. Choose your favorite fast food restaurant from the list. Circle One.

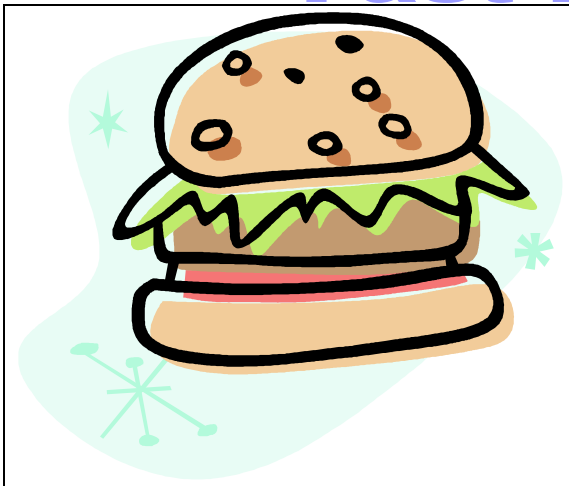
Mc Donald's Wendy's Burger King Subway

2. What is your favorite sandwich? _____

3. What is your favorite side order? _____

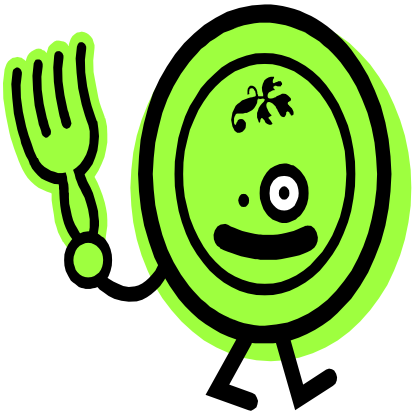
4. What is your favorite drink? _____

Fast Food Cutout



Favorite sandwich_____

Favorite drink_____



Favorite side order_____

Restaurant

FREQUENCY TABLES

FREQUENCY TABLE

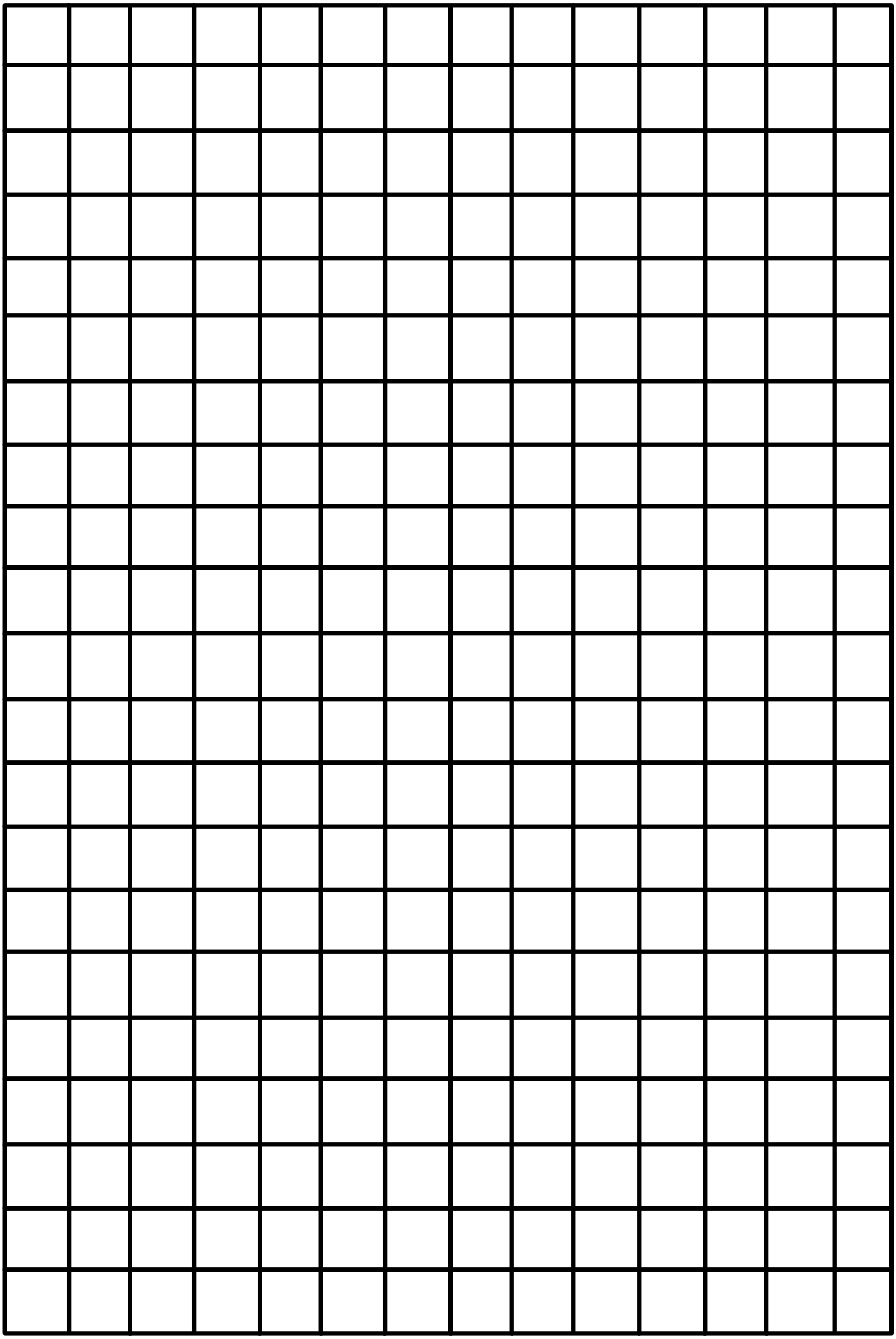
Nutrition Information

Burger King	Calories	Fat	Protein
Original WHOPPER	710	43	31
Original WHOPPER with Cheese	800	50	36
Original Double WHOPPER	980	62	52
Original Double WHOPPER with Cheese	1070	70	57
Original WHOPPER Jr.	390	22	17
Original WHOPPER Jr. with Cheese	440	26	19
King Supreme	550	34	30
Wendy's			
Big Bacon Classic	570	29	34
Jr. Cheeseburger	110	12	17
Jr. Cheeseburger Deluxe	140	16	17
Grilled Chicken Sandwich	300	7	24
Chicken Club Sandwich	170	19	30
McDonald's			
Hamburger	280	10	12
Quarter Pounder with Cheese	530	30	28
Filet-O-Fish	470	26	15
Big Mac	580	17	24
Chicken McGrill	400	26	25

Burger Worksheet
Condiments and Toppings

Burger/Sandwich Components	Calories
Whopper Patty	260
Whopper Bun (5”)	260
Hamburger Patty	140
Hamburger Bun (4”)	160
Breaded chicken Patty	240
Chicken Specialty Bun	210
Fish fillet Patty	160
Veggie Patty	120
Supreme Sauce (1/2 oz)	70
Ketchup (1/2 oz)	15
Lettuce, sandwich cut (3/4 oz)	5
Mayonnaise (3/4 oz)	160
Reduced Fat mayonnaise	70
Mustard (1/9 oz)	5
Onion, sliced (1/2 oz)	5
Pickles (4 slices)	0
Processed American Cheese (2 slices)	90
Tarter Sauce (1/2oz)	80
Tomato (2 slices)	5
	

CENTIMETER GRID PAPER

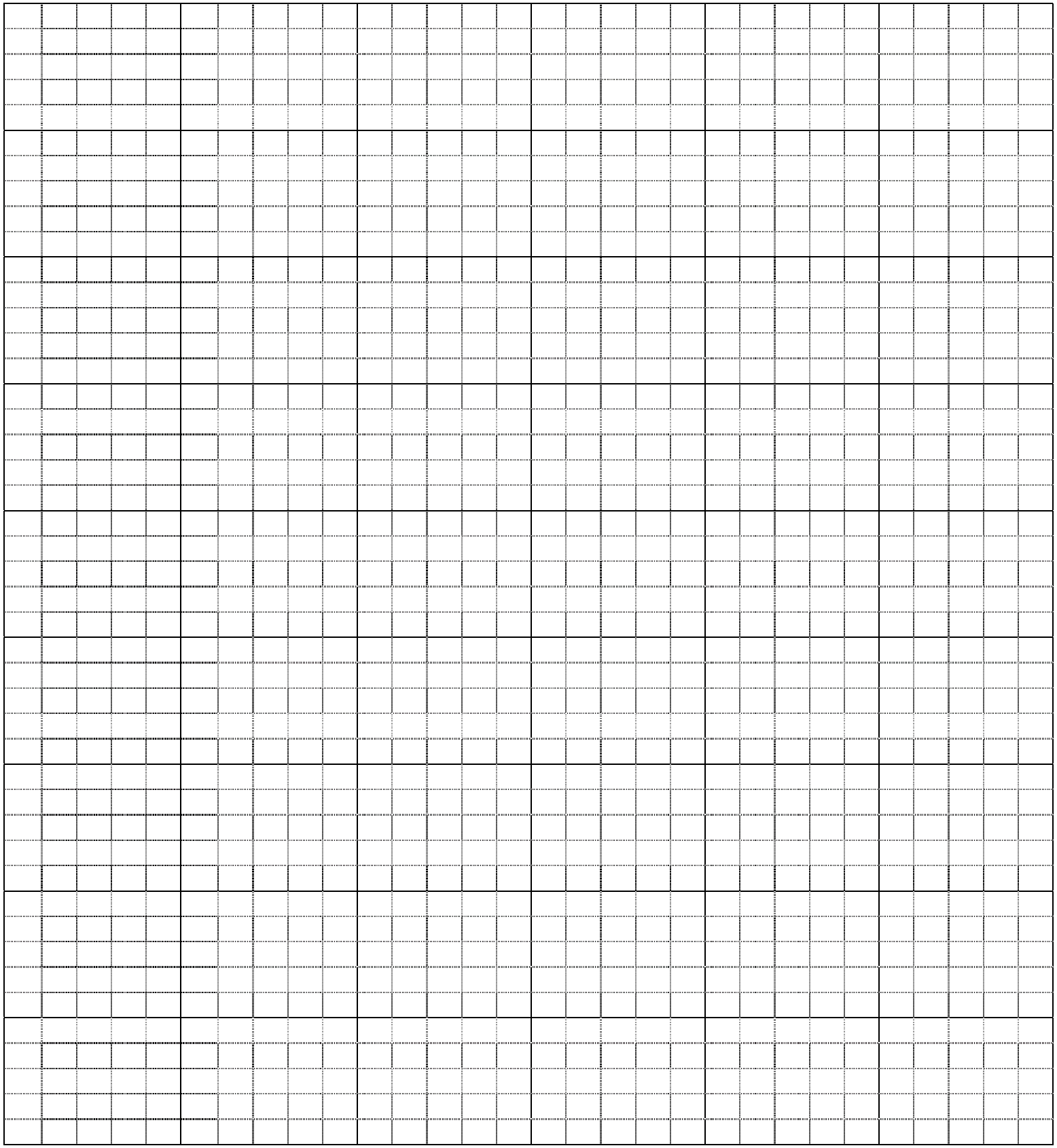


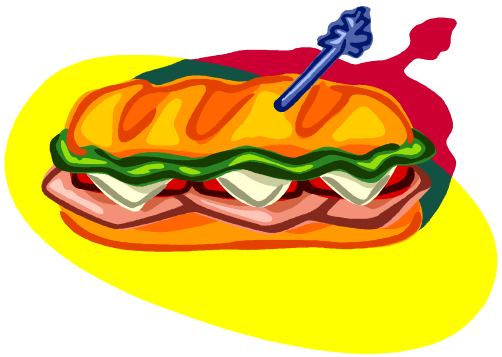
SCHOOL NAME

Teacher Name
Class/Project
Year Semester/Qtr Number

Customize...
Show/Hide Drawing Tools

GRAPH PAPER (5x5)





GLYPH KEY

Construct a circle and ray glyph to represent the nutrition facts about your favorite sandwich.

Restaurant

Brown Circle =Burger King

Yellow Circle=McDonald's

Red Circle =Wendy's

Protein (g)

15g – 20g = Short White Straw (5cm)
20g – 25g =Medium White Straw (8cm)
25g & > =Longer White Straw (11cm)

Calories

272 –350 = Blue straw
351- 439 =Green straw
441 - 614 =Brown straw
615 – 935 =Red straw

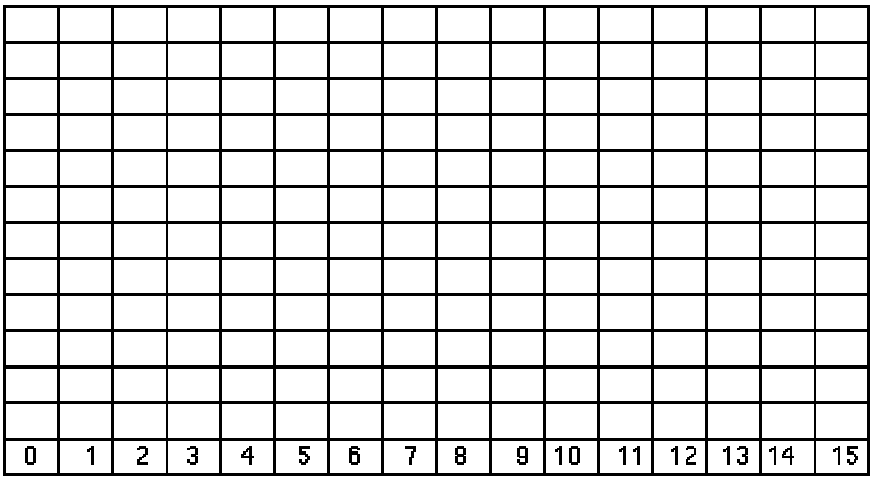
Fat (grams)

7-20g = >
21-40 = >>
41 – 62 = >>>
62 – 70 = >>>>

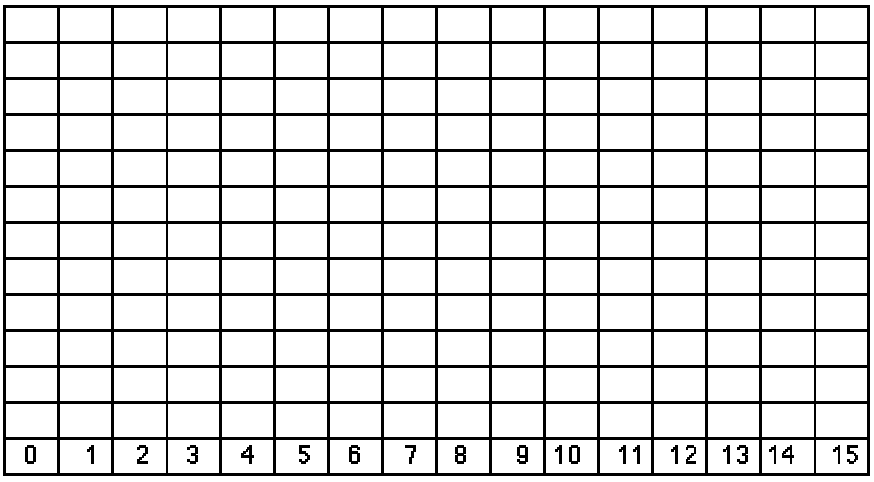
Name: _____ Date: _____

"M&M's"® Candies Worksheet

Use these grids to plot individual colors. Find the mode, median, and mean for each color. On the back of this page, please show how you got your answers.



Color=	**Mode:**	**Median:**	**Mean:**



Color=	**Mode:**	**Median:**	**Mean:**

Candy Survey

Sarah likes M & M's with peanuts. Kevin likes plain M & M's. Oliver also likes plain M & M's. Don and Sue like Almond Joy. I forgot to tell you that Donna, Kathy, and Sam also like M & M's with peanuts. Linda and David like Snickers. Sandra, Erin, and Larry like Skittles and Cindy and Frances chose Starburst.

Make a frequency table for the data in the candy survey. Create a bar graph to display the data.

Frequency Table

Construct a bar graph using the data from your frequency table.

Use your data to make 3 statements about the candy survey. Use words and numbers in your explanation.

1._____

_____

_____

2._____

_____

_____

3._____

_____

_____

Assessment Rubric

3 The response demonstrates a complete understanding and analysis of collecting , organizing and presenting data using graphs.

Student has shown reasonable stategy in the application of collecting, organizing and presenting data.
Student was able to create Graphs and justify how data was collected, and Displayed.

Makes clear connections/ and or justifications of mathematical strategies used to construct a graph that appropriately displays data.

2 The response shows limited understanding and analysis of collecting, organizing and presenting data.

Graph contains inaccurate information

Did not make clear connections/ and or justifications of mathematical strategies used to collect, organize and display information

1. Not able to determine how data was collected or justify the graph

No graphic representation of the data. was indicated.